

## *Diplazium fimbriatum* (Athyriaceae), a New Species from Brazil

CLAUDINE M. MYNSSEN

Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, Rua Pacheco Leão 915, Rio de Janeiro, RJ 22460-030, Brazil. e-mail: cmynssen@jbrj.gov.br

FERNANDO B. MATOS

The New York Botanical Garden, 2900 Southern Blvd., Bronx, NY 10458, U.S.A.  
e-mail: fmatos@nybg.org

**ABSTRACT.**—A new species, *Diplazium fimbriatum* (Athyriaceae), is described and illustrated. It is endemic to the humid montane forests of eastern Brazil, a region known for its high level of endemism and species richness. A comparative table to distinguish it from similar species of *Diplazium* occurring in Brazil is provided.

**KEY WORDS.**—Athyrioid ferns, Atlantic Forest, Bahia, Espinhaço Mountains, Minas Gerais, taxonomy

The Athyriaceae comprises five genera and ca. 600 species (Christenhusz *et al.*, 2011; Rothfels *et al.*, 2012), the majority of which were placed in Woodsiaceae by Smith *et al.* (2006, 2008). *Diplazium* comprises approximately 400 species, with well over 100 in tropical America, where the highest diversity is concentrated in the Andean and Guyanan regional centers (Tryon, 1972). The present work is part of a revision of the genus *Diplazium* in Brazil, which has indicated the occurrence of 22 species in the country, most of these being widely distributed in the coastal Atlantic Forest (Mynssen *et al.*, 2009), including eight endemics (Mynssen, 2010). During this revision more than 30 localities were visited, including the states of Bahia, Espírito Santo, Minas Gerais, Paraná, and Rio de Janeiro. Furthermore, specimens from 45 herbaria were examined, including B, BM, BHCN, CEPEC, CESJ, HB, HBR, INPA, IPA, K, MBM, MBML, MG, NY, OUP, P, R, RB, S, SP, SPF, UPCB, and US (Thiers, 2009).

The species of *Diplazium* are predominantly terrestrial, rarely epipetric, and can be distinguished by the following characters: stems usually ascending to erect, rarely long-creeping, bearing scales at the apex; scales usually non-clathrate, brown to blackish-brown, margin entire or toothed; leaves monomorphic, rarely dimorphic; petioles with two crescent-shaped vascular bundles at the base (in cross section), these uniting distally; lamina simple to 1–4-pinnate-pinnatifid, glabrous or pubescent; veins generally free (simple or furcated), or anastomosing without included veinlets; sori elongate, elliptic to linear, borne on both sides of the vein (diplazioid) or on only one side; indusia generally present, rarely absent (among Brazilian species, indusia are absent, or nearly so, only in *D. lindbergii*), paraphyses absent; spores ellipsoidal, monolete, with wing-like folds, the surface smooth, reticulate or papillate to echinate between the folds.



***Diplazium fimbriatum*** Mynssen & F. B. Matos, *sp. nov.* TYPE.—BRAZIL. Bahia: Camacan, Serra Bonita, Fazenda Uiraçu, trilha da Bapeba, 15°23'30"S, 39°33'55"W, 890 m, 22 Oct 2009, C. M. Mynssen & F. B. Matos 1167 (holotype: RB; isotypes: CEPEC, MO, NY, UC, UPCB). **Figs. 1, 2.**

*Diplazium fimbriatum* *D. mutilo* Kunze multis notis simile a quo margine longo-fimbriato indusii et praesentia gemmarum in rachidi recedit. *Diplazium mutilum* a *D. fimbriato* etiam margine integro vel dentato indusii sui et gemmis in rachidi absentibus differt.

ETYMOLOGY.—From Latin “fimbriatus,” fringed; referring to the fimbriate margins of the indusia.

Plants terrestrial; *stem* 20–40 × 1–1.5 cm, ascending to erect, bearing scales at the apex; *scales* 1.2–2 × 0.1–0.3 cm, concolorous, brown, lanceolate, basifixed, the apices acuminate, sinuate, margins entire to dentate; *leaves* to 150–180 cm long, erect to arched, fasciculate; *petioles* 55–80 × 0.8–1 cm, brown, tomentose, with septate hairs 0.1–0.3 mm, and scales like those of the stems; *lamina* 94–149 × 40–65 cm, chartaceous, 1-pinnate-pinnatifid, lanceolate, gradually tapering to a pinnatifid apex, with proliferous buds in the axils of distal pinnae; *rachises* with septate hairs 0.2–0.4 mm long in adaxial grooves, linear scales 1.5–2.5 × 0.1–0.2 mm and lanceolate scales 1.5–4 × 0.5–0.8 mm abaxially and adaxially; *pinnae* 28–37 × 3–5.5 cm, stalked to 0.4–1.2 cm, 6–14 pairs per lamina, oblong-ovate to deltate, incised 2/3 or less to the costae, bases truncate or round, apices acuminate, margins crenate to slightly serrate, without differentiated marginal cells; *costae* grooved adaxially, with vertical laminar wings 0.2–0.5 mm wide; *veins* free, pinnate, simple or furcate; *indument* adaxially restricted to costal grooves, the hairs similar to those on the rachis, abaxial side of the veins with linear scales, 0.8–1 × ca. 0.1 mm, laminar tissue between veins glabrous on both sides of the lamina; *sori* 5–8 × 0.3 mm, oblong, diplazioid or not; *indusia* commonly persistent, membranaceous, brownish, margins fimbriate, the fimbriae 0.4–0.6 mm long; *spores* brown, ellipsoidal, monolete.

DISTRIBUTION AND ECOLOGY.—Restricted to the humid montane forests of southern Bahia and Minas Gerais, Brazil, where it grows in deep shade and along stream banks, at 250–1200 m. *Diplazium fimbriatum* occasionally shares its habitat with *D. celtidifolium* Kunze, *D. lindbergii* (Mett.) Christ, and *D. mutilum* Kunze, which could favor hybridization within the genus.

CONSERVATION STATUS.—Vulnerable (VU), under criteria D2 (IUCN, 2010). Based on the available collections and recent expeditions carried out by the authors throughout the Brazilian Atlantic Forest, *Diplazium fimbriatum* has a very restricted distribution, being known from only six localities in eastern Brazil (Fig. 2). Although most of these populations are within legally protected areas (i.e., national parks and biological reserves), human activities such as logging and replacement of forests by cattle ranches and plantations (cocoa, coffee and sugarcane) continue to be serious threats. Particularly alarming is the rapid deforestation of Serra do Corcovado, in the municipality of Almadina, a



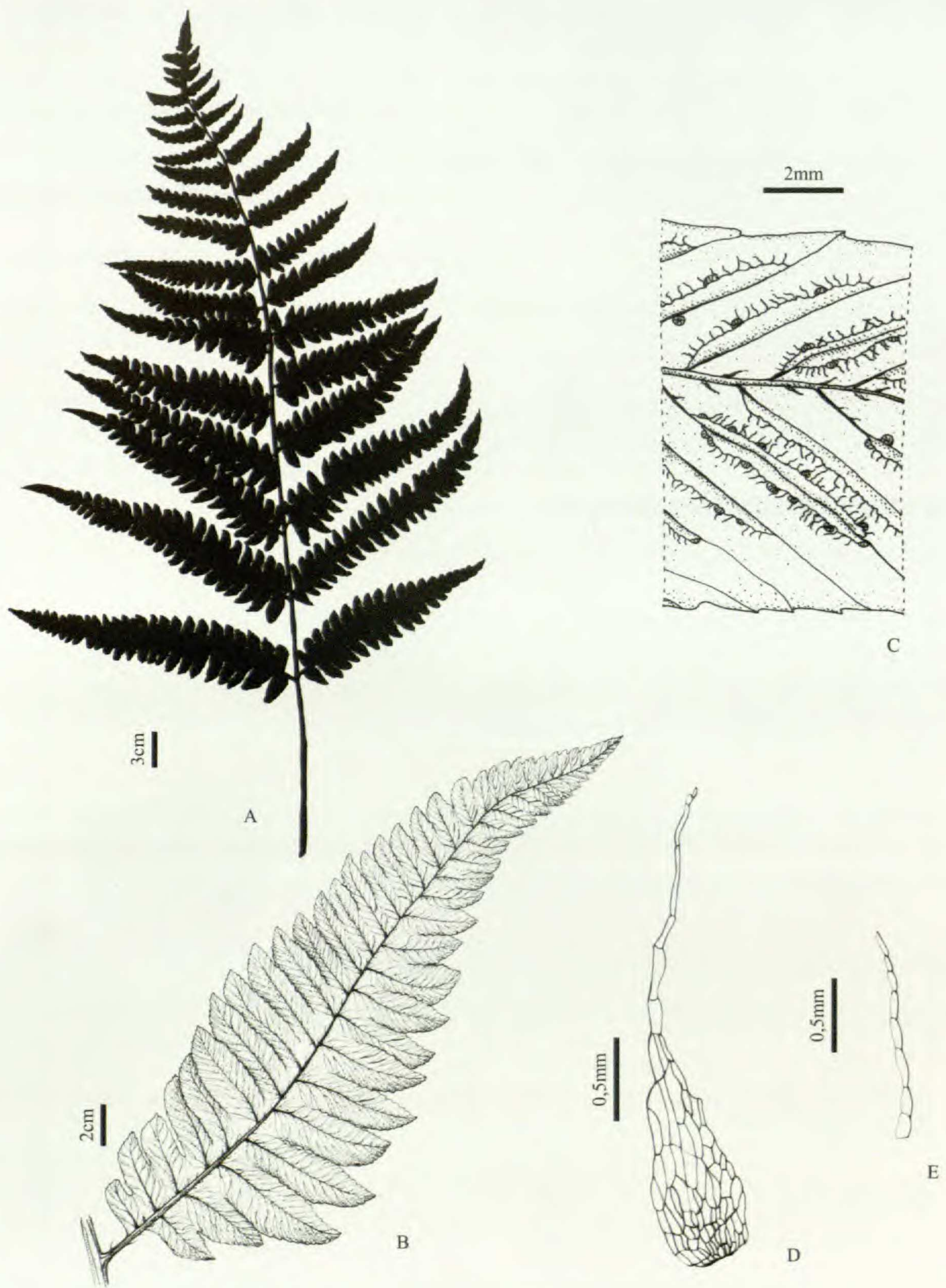


FIG. 1. *Diplazium fimbriatum* A. Lamina (C. M. Mynssen & F. B. Matos 1167). B. Proximal pinnae. C. Abaxial side of median segment, showing sori and indusial margin. D. Lanceolate scale of the lamina. E. Septate hair of the lamina (F. B. Matos et al. 236).



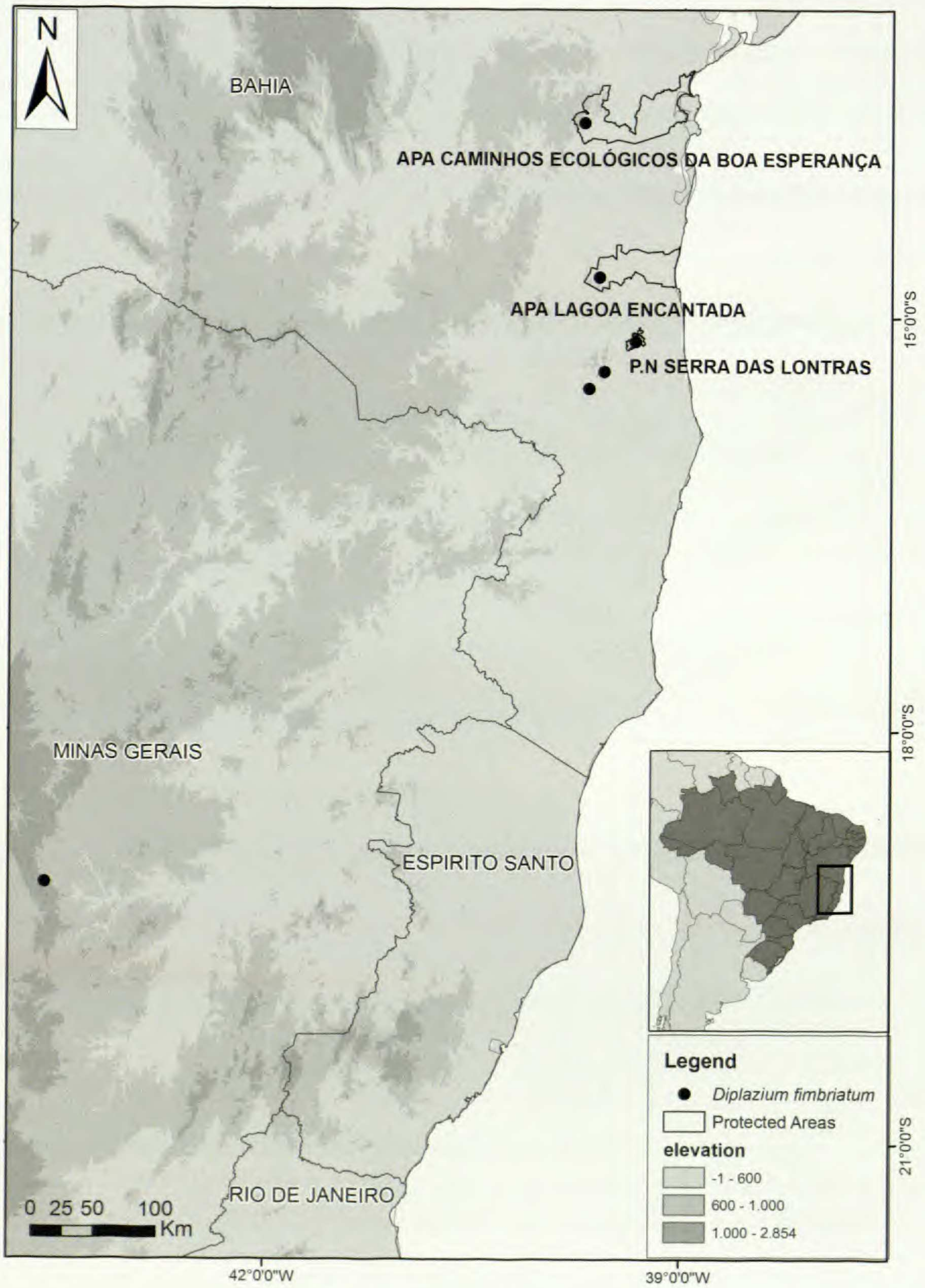


FIG. 2. Distribution map of *Diplazium fimbriatum*, with protected areas indicated.



locality that is becoming well known for increasing records of rare species of ferns (e.g., *Adiantum diphyllum* (Fée) Maxon, *Asplenium truncorum* F. B. Matos, Labiak & L. Sylvestre, and *Megalastrum indusiatum* R. C. Moran, J. Prado & Labiak) and angiosperms (A.M. Amorim, pers. comm.).

PARATYPES.—BRAZIL. **Bahia:** Almandina, Serra do Corcovado, 9.8 km ao SW de Coarací pela estrada para Almandina, seguindo N até a Fazenda São José, 14°42'21"S, 39°36'12"W, 650–750 m, 29 Jan 2005, *F. B. Matos et al.* 236 (CEPEC, MBM, NY, RBR, UPCB); Idem, 19 Apr 2007, *F. B. Matos et al.* 1395 (CEPEC, NY, UPCB); Arataca, Serra do Peito de Moça, estrada entre Arataca e Una, ramal ca. 22.4 km de Arataca, entrada pelo assentamento Santo Antônio, Reserva Particular do Patrimônio Natural Caminho das Pedras, 15°10'25"S, 39°20'30"W, 1000 m, 16 Feb 2006, *F. B. Matos et al.* 994 (CEPEC, UPCB); Camacan, Serra Bonita, Fazenda Paris, trilha às margens de córrego, 15°30'52"S, 39°40'27"W, 250m, 21 Oct 2009, *C. M. Mynssen & F. B. Matos* 1154, 1155 (CEPEC, RB); Wenceslau Guimarães, Estação Ecológica Estadual Nova Esperança, início da trilha para o Pico do Urubu, 13°35'34"S, 39°42'58"W, 450–650 m, 4 May 2007, *J. Jardim et al.* 5024 (CEPEC, UPCB). **Minas Gerais:** Conceição do Mato Dentro, Parque Natural do Ribeirão do Campo, 1 Oct 2002, *R. C. Mota et al.* 1540 (BHCB); Idem, mata de galeria do córrego da mina, 19°06'19"S, 43°34'04"W, 1175m, 30 May 2005, *A. Salino et al.* 8748 (BHCB).

*Diplazium costale* (Sw.) C. Presl var. *robustum* (Sodiolo) Stolze, endemic to Ecuador (Stolze *et al.* 1994), resembles *D. fimbriatum* in blade dissection, leaf length, and presence of proliferous buds on the axils of distal pinnae. Nevertheless, it differs from *D. fimbriatum* by abundant costal scales and the robust falcate sori closer to the costae with entire indusia (vs. delicate oblong sori with fimbriate indusia). Fée (1869) applied the name *D. costale* to two specimens collected in Brazil; however, a careful examination of these specimens shows that *Blanchet* 535 (NY) refers to *D. celtidifolium* Kunze, whereas *D. rostratum* Fée would be the correct name for *Miers* 164 (K).

Also similar is *Diplazium macrophyllum* Desv. (Venezuela, Colombia, Ecuador, Peru, and Bolivia), which differs by the broader pinnae (9–22 vs. 3–5.5 cm), and the shape of the apices of ultimate segments, which are attenuate or acuminate (vs. obtuse to acute in *D. fimbriatum*). Furthermore, the veins of *D. macrophyllum* are sparsely provided abaxially with lanceolate to deltate scales (1–1.5 × 0.3–0.5 mm), whereas in *D. fimbriatum* these scales are filiform to linear.

Several other species that occur in Brazil are also probably related to the new species (Table 1). *Diplazium celtidifolium* Kunze has similar linear and lanceolate scales on the rachises, and also has buds on the axils of distal pinnae, but differs from *D. fimbriatum* by the shape of the pinnae (oblong to lanceolate vs. oblong-ovate to deltate), and indusia margins (entire to dentate vs. fimbriate). Moreover, the pinnae of *D. celtidifolium* are usually less incised, often entire. From *D. mutilum* Kunze, a Brazilian endemic, *D. fimbriatum* differs by the presence of proliferous buds and fimbriate indusia (vs. entire to



TABLE 1. Comparisons between *Diplazium fimbriatum* and other similar species of *Diplazium* occurring in Brazil.

Species	Proliferous buds	Proximal pinnae	Pinnae indument	Indusia
<i>D. fimbriatum</i>	Present (axils of distal pinnae)	oblong to ovate	septate hairs plus linear and lanceolate scales	long-fimbriate catenate
<i>D. mutilum</i>	Absent	oblong	septate hairs and filiform scales	entire to dentate
<i>D. celtidifolium</i>	Present or not (axils of distal pinnae)	oblong to lanceolate	septate hairs and linear scales	entire to dentate
<i>D. lindbergii</i>	Absent	oblong	septate hairs and filiform scales	absent or vestigial

dentate in *D. mutilum*). Another species in Brazil, *D. lindbergii* (Mett.) Christ, has similar habit, blade dissection and leaf length, but can be easily distinguished by indusia absent or vestigial and lack of proliferous buds on the lamina.

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